



US005888126A

United States Patent [19]**Hirose et al.****[11] Patent Number: 5,888,126****[45] Date of Patent: Mar. 30, 1999****[54] POLISHING APPARATUS INCLUDING TURNTABLE WITH POLISHING SURFACE OF DIFFERENT HEIGHTS**

[75] Inventors. **Masayoshi Hirose**, Yokohama; **Yoshimi Sasaki**, Atsugi; **Akira Ogata**; **Seiji Ishikawa**, both of Yokohama; **Tamami Takahashi**, Yamato; **Hirokuni Hiyama**, Tokyo; **Yutaka Wada**, Yokohama, all of Japan

[73] Assignee: **Ebara Corporation**, Tokyo, Japan

[21] Appl No.: **590,836**

[22] Filed: **Jan. 24, 1996**

[30] Foreign Application Priority Data

Jan. 25, 1995 [JP] Japan 7-028722
Jul. 20, 1995 [JP] Japan 7-206594

[51] Int. Cl.⁶ **B24B 29/02**

[52] U.S. Cl. **451/287; 451/288; 451/495, 451/527**

[58] Field of Search 451/41, 293, 285,
451/287, 288, 289, 290, 495, 520, 527,
528, 530

[56] References Cited**U.S. PATENT DOCUMENTS**

3,603,042 9/1971 Boettcher 451/288
5,081,795 1/1992 Tanaka et al. 451/288
5,212,910 5/1993 Breivogel et al. 451/287 X
5,216,843 6/1993 Breivogel et al. 451/287 X

5,297,364 3/1994 Tuttle 451/527
5,435,772 7/1995 Yu 451/288 X
5,558,563 9/1996 Cote et al. 451/288 X
5,562,529 10/1996 Kishii et al. 451/289 X
5,564,965 10/1996 Tanaka et al. 451/287

FOREIGN PATENT DOCUMENTS

26596 2/1979 Japan 451/288
117064 6/1986 Japan 451/288
3-259520 11/1991 Japan

Primary Examiner—Timothy V. Eleg
Attorney, Agent, or Firm—Wenderoth, Lind & Ponack,
L.L.P.

[57] ABSTRACT

A polishing apparatus includes a turntable with an abrasive cloth mounted on an upper surface thereof, and a top ring disposed above the turntable for supporting a workpiece to be polished and pressing the workpiece against the abrasive cloth under a predetermined pressure. The turntable and the top ring are movable relatively to each other to polish a surface of the workpiece supported by the top ring with the abrasive cloth. The abrasive cloth has a projecting region on a surface thereof for more intensive contact with the workpiece than other surface regions of the abrasive cloth. The projecting region has a smaller dimension in a radial direction of the turntable than a diameter of the workpiece when the projecting region is held in contact with the workpiece. A position of the projecting region is determined on the basis of an area in which the projecting region acts on the workpiece.

21 Claims, 21 Drawing Sheets

